

R E M A R K S

This is in response to the Office Action that was mailed on July 29, 2004. Claims 1, 3-18, and 20-25 are pending in the application. Applicants gratefully acknowledge the Examiner's indication that claims 3, 4, and 17 are drawn to allowable subject matter.

The Examiner's attention is respectfully directed to the fact that in the discussion which follows, Applicants present arguments for the patentability of the present invention that go beyond arguments previously expressed herein. Accordingly, thorough consideration of the details of this new response is earnestly solicited.

Claims 1, 5, 9-11, 13, 14, 16, 21, and 22 is rejected under 35 U.S.C. §103(a) as being unpatentable over JP 10-029276 (Polyplastics) in view of US 5,108,844 (Blemberg). Claim 6 is rejected under 35 U.S.C. §103(a) as being unpatentable over Polyplastics in view of Blemberg and US 4,377,667 (Sakurai). Claims 7, 8, 12, 15, 20, 23, and 24 are rejected under 35 U.S.C. §103(a) as being unpatentable over Polyplastics in view of Blemberg and US 4,535,127 (Matsuzaki). Claim 18 is rejected under 35 U.S.C. §103(a) as being unpatentable over Polyplastics in view of Blemberg and JP 58-053953 A (JSR). Each of these grounds of rejection is respectfully traversed.

Claim 1 herein recites:

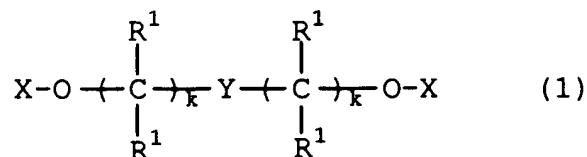
1. A thermoplastic resin integrated structure, which comprises:
 - a structural member (A) molded from a resin composition (a) comprising 5-80% by weight of polyacetal resin (a-1) and 20-95% by weight of at least one resin (a-2) selected from the group consisting of polyolefin resin, olefinic elastomer and hydrogenated butadienic elastomer;
 - a structural member (B) molded from thermoplastic resin (b); and
 - a structural member (C) consisting essentially of polyacetal resin (c), andincludes at least one structure of structural member (C) – structural member (A) – structural member (B) as integrated together in this order, wherein the structural member (A) and the structural member (B) are integrated together by welding.

WELDING

Claims 1 and 20 herein require that the structural member (A) and the structural member (B) be integrated together by welding. Polyplastics teaches only that the polyacetal resin layer and the olefin resin layer (and optionally the adhesive layer) are subjected to melt extrusion molding or blow molding. Polyplastics is silent about an integration of the adhesive layer and the olefin resin layer by welding.

The Examiner has not shown how the prior art suggests integrating a structural member (A) molded from a resin composition (a) comprising 5-80% by weight of polyacetal resin (a-1) and 20-95% by weight of at least one resin (a-2) selected from the group consisting of polyolefin resin, olefinic elastomer and hydrogenated butadienic elastomer with a structural member (B) molded from thermoplastic resin **by welding** (claim 1).

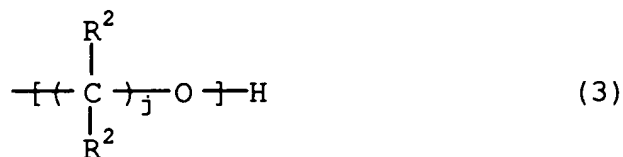
The Examiner has not shown how the prior art suggests integrating a structural member (A) molded from a resin composition (a) comprising 5-80% by weight of polyacetal resin (a-1) comprising a polyacetal block copolymer having a number average molecular weight of 10,000-500,000, which comprises polyacetal segments (X) and a hydrogenated polybutadiene segment (Y) having a number average molecular weight of 500-10,000, hydroxyalkylated at both ends, represented by the following formula (1):



[where X comprises 95-99.9 mol.% of oxymethylene units and 0.1-5 mol.% of oxyalkylene units represented by the following formula (2):



(where R² is independently selected from the group consisting of hydrogen, an alkyl group, a substituted alkyl group, an aryl group and a substituted aryl group and j is an integer selected from 2 to 6), and the terminal groups are polyacetal copolymer residues having a structure represented by the following formula (3):



(where R² and j have the same meanings as defined above), Y is a hydrogenated polybutadiene containing 70-98 mol.% of 1,2 bonds and 2-30 mol.% of 1,4 bonds and having an iodine value of not more than 20g-I₂/100g, R¹ is independently selected from the group consisting of hydrogen, an alkyl group, a substituted alkyl group, an aryl group and a substituted aryl group and k is an integer selected from 2 to 6, where two ks may be the same or different from each other) and 20-95% by weight of at least one resin (a-2) selected from the group consisting of polyolefin resin, olefinic elastomer and hydrogenated butadienic elastomer with a structural member (B) molded from thermoplastic resin **by welding** (claim 20).

The Examiner's attention is thus directed to the welded feature that characterizes the present claimed structures.

UNMODIFIED POLYACETAL RESIN

Polyplastics discloses a laminate comprising a polyacetal resin layer – corresponding to a structural member (C) of claim 1 herein, an olefin resin layer – corresponding to a structural member (B) of claim 1, and an adhesive layer containing modified olefin – allegedly corresponding to a structural member (A) of claim 1. (Incidentally, it is noted that the Office Action, in the 7th line of Item

7. on page 3, refers to “molded layer C” where it intends “molded layer A”.) It is recalled that structural member (A) in the present invention is molded from both polyacetal resin and olefin resin. The Examiner acknowledges that Polyplastics does not teach that the adhesive layer (A) should additionally comprise polyacetal.

Blemberg teaches that adhesion between certain resin layers X and Y can be improved by blending predetermined amounts of X and Y into layers Y and X, respectively. However, the only resin layers to which the Blemberg disclosure refers are polyolefins, vinylidene chloride copolymers, polyesters, polyamides, polycarbonates, and similar polymers. Column 2, line 32 through column 3, line 2. The Examiner has asserted without basis that it is obvious therefore to add polyacetal to the adhesive layer taught in Polyplastics.

Even assuming that the Examiner’s extrapolation of the Blemberg teaching is valid – which it is not – this position of the Examiner is taken as meaning that one of ordinary skill in the art would be motivated by Blemberg to add **unmodified** polyacetal to the adhesive layer containing modified olefin. Applicants respectfully disagree! The Examiner’s contention in this regard must be considered in the light of the overall knowledge of those of ordinary skill in the relevant art.

It is well know in the art that polyacetal resin is quite incompatible with other resins. Those of ordinary skill in the art have attempted to find ways to improve adhesion between polyacetal resin and other resins. The inventive

concept of the Polyplastics reference relates to an improvement of adhesion between a polyacetal resin layer and an olefin resin layer by introducing a modified polyacetal resin and a modified olefin resin into the respective layers. In other words, Polyplastics improves adhesion between polyacetal resin and olefin resin by means of interaction between functional groups in the compounds used for modifying the polyacetal and olefin resins. The adhesive layer of Polyplastics, which corresponds to structural member (A) of the present claim 1, contains modified olefin resin. The modified olefin resin interacts with the modified polyacetal resin of the polyacetal resin layer so as to form the laminate structure. In these circumstances, a person of ordinary skill in the art attempting to improve adhesion between a polyacetal resin layer and an olefin resin layer would not be motivated to add an **unmodified** polyacetal resin – which has little compatibility to other resins – to the adhesive layer of Polyplastics.

Accordingly, although Polyplastics actually discloses that the polyacetal resin layer comprises both an unmodified polyacetal resin and a modified polyacetal resin, it would be impossible absolutely for a person skilled in the art to arrive at the conclusion that an unmodified polyacetal resin could be added to the adhesive layer of Polyplastics just in view of the teaching of Blemberg.


For all of the above reasons, the Examiner is requested to withdraw the rejections of record, and to pass this application to Issue.

Should there be any remaining issues to be resolved in the present application, the Examiner is respectfully requested to contact Richard Gallagher (28,781) at (703) 205-8008.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By 
Raymond C. Stewart, #21,066

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

0152-0551P

RG
RCS/RG/jmb

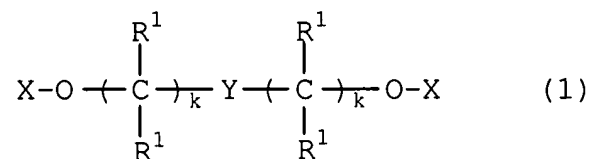
Claims Appendix:

1. A thermoplastic resin integrated structure, which comprises:
a structural member (A) molded from a resin composition (a) comprising 5-80% by weight of polyacetal resin (a-1) and 20-95% by weight of at least one resin (a-2) selected from the group consisting of polyolefin resin, olefinic elastomer and hydrogenated butadienic elastomer;
a structural member (B) molded from thermoplastic resin (b); and
a structural member (C) consisting essentially of polyacetal resin (c), and
includes at least one structure of structural member (C) – structural member (A) – structural member (B) as integrated together in this order,
wherein the structural member (A) and the structural member (B) are integrated together by welding.
3. A thermoplastic resin integrated structure according to claim 1, wherein the structural member (A) is a laminate composed of at least two layers each molded from the resin compositions (a), which are different from each other in the composition.
4. A thermoplastic resin integrated structure according to Claim 3, wherein content of polyacetal resin (a-1) in the layer in contact with the structural member (C) is larger than that of polyacetal resin (a-1) in the layer in contact with the structural member (B).
5. A thermoplastic resin integrated structure according to Claim 1, wherein the polyacetal resin (a-1) is a polyacetal copolymer having hydroxyalkyl groups at the molecule terminals and a hydroxyalkyl group terminal concentration of not less than 5×10^{-5} mole per mole of oxymethylene units.

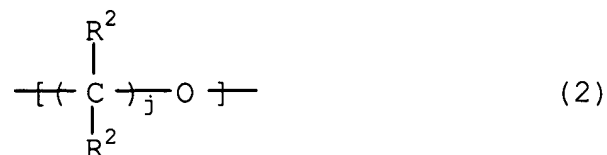
6. A thermoplastic resin integrated structure according to Claim 1, wherein the polyacetal resin (a-1) comprises a polyacetal copolymer obtained by using water or an aliphatic alcohol having not more than 10 carbon atoms as a chain transfer agent, or together with formal, if required.

7. A thermoplastic resin integrated structure according to Claim 1, the polyacetal resin (a-1) comprises a polyacetal block copolymer obtained by copolymerizing cyclic acetal with cyclic ether and/or cyclic formal, using a polymer having at least one hydroxyl group and a molecular weight of 500-10,000 as a chain transfer agent.

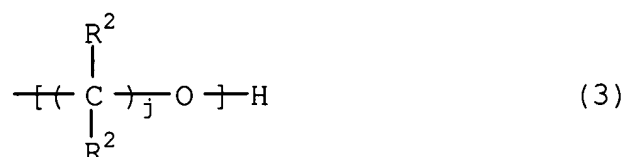
8. A thermoplastic resin integrated structure according to any one of Claims 1-7, wherein the polyacetal resin (a-1) comprises a polyacetal block copolymer having a number average molecular weight of 10,000-500,000, which comprises polyacetal segments (X) and a hydrogenated polybutadiene segment (Y) having a number average molecular weight of 500-10,000, hydroxy-alkylated at both ends, represented by the following formula (1):



[where X comprises 95-99.9 mol.% of oxymethylene units and 0.1-5 mol.% of oxyalkylene units represented by the following formula (2):



(where R^2 is independently selected from the group consisting of hydrogen, an alkyl group, a substituted alkyl group, an aryl group and a substituted aryl group and j is an integer selected from 2 to 6), and the terminal groups are polyacetal copolymer residues having a structure represented by the following formula (3):



(where R^2 and j have the same meanings as defined above), Y is a hydrogenated polybutadiene containing 70-98 mol.% of 1,2 bonds and 2-30 mol.% of 1,4 bonds and having an iodine value of not more than 20g-I₂/100g, R^1 is independently selected from the group consisting of hydrogen, an alkyl group, a substituted alkyl group, an aryl group and a substituted aryl group and k is an integer selected from 2 to 6, where two k s may be the same or different from each other].

9. A thermoplastic resin integrated structure according to Claim 1, wherein the resin (a-2) is at least one resin selected from the group consisting of polyethylene homopolymer, polyethylene copolymer, block copolymer containing ethylene as the main component and ionomer.

10. A thermoplastic resin integrated structure according to Claim 1, wherein the resin (a-2) is a modified α -olefinic polymer.

11. A thermoplastic resin integrated structure according to Claim 1, wherein the resin (a-2) is a resin composition comprising:

at least one resin selected from the group consisting of polyethylene homopolymer, polyethylene copolymer, block copolymer containing ethylene as the main component and ionomer; and

at least one resin selected from the group consisting of modified α -olefinic polymers.

12. A thermoplastic resin integrated structure according to Claim 8, wherein the resin (a-2) is a resin composition comprising:

at least one resin selected from the group consisting of polyethylene homopolymer, polyethylene copolymer, block copolymer containing ethylene as the main component and ionomer; and

at least one resin selected from the group consisting of modified α -olefinic polymers.

13. A thermoplastic resin integrated structure according to Claim 1, wherein the thermoplastic resin (b) is a polyolefin resin.

14. A thermoplastic resin integrated structure according to Claim 1, wherein the thermoplastic resin (b) is a resin selected from the group consisting of polyethylene homopolymer, polyethylene copolymer, block copolymer containing ethylene as the main component, ionomer and mixtures of at least two thereof.

15. A thermoplastic resin integrated structure according to Claim 8, wherein the thermoplastic resin (b) is a resin selected from the group consisting of polyethylene homopolymer, polyethylene copolymer, block copolymer containing ethylene as the main component, ionomer and mixtures of at least two thereof.

16. A thermoplastic resin integrated structure according to Claim 1, wherein the thermoplastic resin (b) is a modified α -olefinic polymer.

17. A thermoplastic resin integrated structure according to Claim 1, wherein the thermoplastic resin (b) is a polyacetal resin.

18. A thermoplastic resin integrated structure according to Claim 1, wherein the thermoplastic resin (b) is a polyamide resin.

20. A thermoplastic resin integrated structure according to Claim 8, wherein the structural member (A) and the structural member (B) are integrated together by welding.

21. A thermoplastic resin integrated structure according to Claim 1, wherein the structural member (A) and the structural member (B) are integrated together by a molding process selected from the group consisting of injection molding of different materials, resin insert injection molding, coextrusion molding of different materials and multilayer blow molding.

22. A thermoplastic resin integrated structure according to Claim 1, wherein the structural members (C)-(A)-(B) are integrated together in this order by welding or a molding process selected from the group consisting of injection molding of different materials, resin insert injection molding, coextrusion molding of different materials and multilayer blow molding.

23. Automobile parts made from the thermoplastic resin integrated structure according to Claim 8.

24. Automobile fuel-tank-related parts made from the thermoplastic resin integrated structure according to Claim 8.

25. A method of integrating a structural member (B) molded from polyolefin resin and a structural member (C) consisting essentially of polyacetal resin, comprising using a structural member (A) molded from a resin composition (a) comprising 5-80% by weight of polyacetal resin (a-1) and 20-95% by weight of at least one resin (a-2) selected from the group consisting of polyolefin resin, olefinic elastomer and hydrogenated butadienic elastomer.